PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Form PCT/IPEA/416	
520-PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE2003/001473	22.09.2003	19.11.2002
International Patent Classification (IPC) or national classification and IPC		
G01N 33/543, C12Q 1/68		
Applicant		
Biacore AB et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☐ *(sent to the applicant and to the International Bureau)* a total of _____ sheets, as follows:
      ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☐ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
11.06.2004	22.02.2005
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International Application No.
PCT/SE2003/001473

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☒ the international application as originally filed/furnished

☐ the description:

pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ the claims:

pages _____ as originally filed/furnished
pages* _____ as amended (together with any statement) under Article 19
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ the drawings:

pages _____ as originally filed/furnished
pages* _____ received by this Authority on _____
pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____
☐ the claims, Nos. _____
☐ the drawings, sheets/figs _____
☐ the sequence listing *(specify)*: _____
☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International Application No.
PCT/SE2003/001473

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-20	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:
D1: WO0172458 A1
D2: US5955729 A
D3: US2002168644 A1
D4: US6294391 B1
D5: WO0223199 A2

D1 relates to heterofunctional cross linking reagents, protein labeling reagents, protein conjugates and their compositions, support-bound cross linking groups, modified supports and protein arrays for site specific binding of proteins. From D1, it is known to attach a protein to a solid support by associating a protein containing a tag with a protein tag binder, see page 6, lines 3-10. D1 also discloses a method for covalently attaching a protein to the surface by linking groups. From D1, the techniques for attaching a biomolecule (a protein) containing a tag by binding sites for the biomolecule tag and for covalently attaching a biomolecule to activated reactive groups (support-bound cross linking groups) to a solid support is known. The claimed invention according to claims 1, 12, 18, 20 does not describe anything new about the technique to a person skilled in the art. Therefore, the invention according to claims 1, 12, 18, 20 is not considered to involve an inventive step.

According to D1, page 6, lines 12-15, the steps of attaching a biomolecule covalently or by a tag could be performed in any order. Hence, the claimed invention according to claim 2 does not involve an inventive step.

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

The claimed invention according to claim 3 differs from D1 in that it uses an amino group from the biomolecule and a carboxyl group of the sensor chip to create a covalent bond. Claim 3 is considered to describe the amine coupling method, which is well known for a person skilled in the art. That this technique is known is also indicated in the description of the claimed invention. Therefore, it is considered obvious to a person skilled in the art to use the technique known in D1 and combine it with already established techniques to create a covalent bond between a biomolecule and a surface. Hence, the claimed invention according to claim 3 is not considered to involve an inventive step. Likewise, it is considered obvious to a person skilled in the art to combine the knowledge in D1 with well known techniques of couplings involving tags. The description in the claimed invention states that it is known to introduce histidine tags into the protein and then bind the protein to a sensor chip coated with nitrilotriacetic acid (NTA) through Ni2+. This technique is also described in D1, page 26, lines 3-16. Therefore, the claimed invention according to claims 4-7 is not considered to involve an inventive step. The techniques described in claims 8, 9, 10, 19 are also considered to relate to methods known to a person skilled in the art. Hence, the claimed invention according to claims 8, 9, 10, and 19 is not considered to involve an inventive step.

Claim 11 is considered to relate to measures obvious for a person skilled in the art and its features are described in D1, page 13, lines 17-18. Hence, the claimed invention according to claim 11 is not considered to involve an inventive step.

The invention in D1 could be used in determining protein-protein interactions, see page 2, lines 8-11. Claim 17 differs from D1 in that it uses surface plasmon resonance (SPR). It is considered obvious to a person skilled in the art to combine what is known from D1 with a well known technique like SPR. The claimed invention according to claims 16 and 17 is therefore not considered to involve an inventive step.

Claims 13 and 15 differ from D1 in that they explicitly describe that a low molecular weight compound is analysed. D1

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

describes the characterisation of protein-protein, protein-nucleic acid, protein-drug, and protein-ligand interactions, see page 2, lines 8-11. Claims 13 and 15 do not describe what kind of low molecular compounds could be analysed and what value their molecular weight could have. Since, the definition of the low molecular weight compound is broad and the technique described in D1 is considered to correspond to the technique described in claims 13 and 15, it is considered that the method described in claims 13 and 15 is included in the method described in D1. Hence, the claimed invention according to claims 13 and 15 is not considered to involve an inventive step.

Claim 14 is considered to relate to measures obvious for a person skilled in the art. Hence, the claimed invention according to claim 14 is not considered to involve an inventive step.

D2 describes surface plasmon resonance mass spectroscopy which comprises capturing an analyte in a sample by an interactive surface layer of an interaction analysis sensor where it is analysed by surface plasmon resonance. The captured analyte is identified by desorbing and ionising the analyte from the interactive surface layer while under vacuum in a mass spectrometer. Also claimed is a surface plasmon resonance mass spectroscopy device comprising a transparent material fixed to a conductive material capable of supporting surface plasmon resonance. An interactive surface is fixed to the conductive material. This may be exposed to the interior of a mass spectrometer without breaking the vacuum, see abstract.

D3 describes a molecule which is labeled by contacting a sample molecule with a solid support coupled to a chemical group, comprising a cleavable functional group, functional group(s) and a reactive group, under conditions allowing the sample molecule to covalently bind to the reactive group; and cleaving the cleavable functional group, thus releasing the sample molecule comprising the functional groups, see abstract.

D4 discloses a method of detecting the presence of an analyte of interest in a sample, the method comprising the steps of:

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

providing a binding partner reversibly immobilised on a solid support, said binding partner having binding specificity for the analyte; contacting the sample with the solid support; specifically displacing the binding partner from the solid support in response to the presence of the analyte of interest in the sample, said displacement causing a reduction in the mass of material immobilised on the solid support, thereby generating a detectable change in a mass-dependent property of the solid support; and detecting said change. Also disclosed is an assay device for performing the method of the invention, see abstract.

D5 relates to methods, systems, databases and devices for discovering and preparing chemical compounds for medical and other uses, see abstract.

Documents D2-D5 merely describe the prior art and are not commented on further.

To summarise, the claimed invention according to claims 1-20 is new, but lacks inventive step. Claims 1-20 have industrial applicability.